

3.6 Landscaping

BACKGROUND AND PURPOSE

Properly executed landscaping provides a variety of ecological, community, and visual benefits including an aesthetically appealing environment, creating a balance between hard streetscapes and soft landscapes, establishing or enhancing vegetative buffers, creating rain gardens to abate stormwater impacts, promoting native and water efficient plantings, and protecting and enhancing wildlife habitat. While communities may be particularly interested in promoting landscaping to achieve one of these functions, good landscape designs typically address a combination of these benefits.

ECOLOGICAL SERVICES PROVIDED

When properly designed and installed landscaping provides substantial ecological benefits. For example, deciduous trees can reduce energy demands on heating and cooling systems for buildings by providing shade during summer months and allowing sunlight to pass through to heat building exteriors during winter months. Trees can also shade paved parking areas and roads thereby reducing the heating effects created as a result of these paved areas. Landscaping can also contribute to a reduction in noise through use of vegetated buffers, water pollution from improved erosion control, and air pollution through filtering of air borne particulates.

WILDLIFE HABITAT

The types of wildlife species attracted to a site will depend on the food and cover provided by layers of vegetation. Canopies formed by the tallest tree branches; under-story vegetation created by smaller trees, shrubs and vines; low lying ground covers; and the underlying soil each attract different species of wildlife. When combinations of plant types are provided the resulting vegetation will likely attract a wide variety of wildlife to a single lot, big or small.

RELATED TOOLS:

- Stormwater Management
- Habitat Protection
- Steep Slope and Ridgeline Protection

FIGURE 3.6.1



Landscapes with multiple layers of plants provide several ecological services that include: filtering of pollutants; providing habitat for a wide array of wildlife; and slowing the force of rainfall as droplets break into smaller and smaller units until they soak into the ground resulting in reduced soil erosion and runoff.

FIGURE 3.6.2



A tree-lined street provides a shadier, cooler, more inviting, and an aesthetically pleasing environment. Studies show that people spend more time in a business area where trees are included in the streetscape.

WATER USE EFFICIENCY

Lawn and landscape watering are non-essential water uses. Properly located and designed landscapes promote water use efficiency through the selection of plants that are appropriate for and tolerant of the site conditions. For example, native species planted in proper locations, typically require less watering than non-native species. Many ornamental varieties and/or hybrids including grasses, which are now available, have been selected specifically for their drought tolerance. In addition, trees and plants in landscaped environments have root systems that help to promote on-site infiltration by slowing the flow of water. Non-living landscape materials such as crushed stone or pervious pavement, when combined with vegetated environments, also support efficient water use.

PROTECTING SOILS

Healthy landscapes are based on healthy soils. The most valuable soils on site will most likely be those that are undisturbed by human impacts, which contain soil life and soil horizons. Before any construction begins, it is critical to protect the site's existing soil.

ESTABLISHING OR ENHANCING BUFFERS

Landscaping can be used to create buffers between types of uses such as commercial and residential. In districts that allow for a mix of uses vegetated buffers can be used to create a sense of separation and privacy for the respective uses while also improving the aesthetics of a site and the district as a whole.

SOFTENING THE STREETSCAPE

Similar to the function of vegetated buffers in separating uses, streetscapes can be softened by using landscape strips, low hedges, stone walls, and other features to

distinguish the street from the uses fronting on the street. This effect creates a more pleasant environment for pedestrians. In some circumstances the visual effects of a narrowed street can help slow passing traffic, also known as traffic calming.

AESTHETICS

New Hampshire communities possess a variety of natural and cultural features, which may include mountains, water bodies, forestland, open fields, agriculture, parks, tree-lined streets, wetlands, gardens, and stone walls. Regionally appropriate and well-planned development that incorporates and highlights these features supports community character, which in turn can have a positive effect on local economies and quality of life.

FIGURE 3.6.3



Landscaping enhances Manchester's mill girl, reminding people of the past and connecting them to the present.

APPROPRIATE CIRCUMSTANCES AND CONTEXT FOR USE

When considering the impacts of development on the environment, preservation of the existing landscape is generally the most desirable though not always a practical or feasible option. Most new, expanded, or re-development construction projects require at least some new landscaping following site construction and development.

If a municipal master plan includes goals such as promoting water use efficiency, maintaining community character through landscape standards, or creating and preserving wildlife habitat through site design, zoning and regulations can be adopted to support those goals. It is important to understand whether the goals apply town-wide or to a specific zoning district such as a “Village District” or “Industrial District” so the standards can be developed accordingly.

Each proposed development within the district(s) where landscaping standards apply, will present a unique landscaping opportunity. While a set of minimum standards can be developed as part of a local zoning ordinance, adopting more comprehensive landscaping requirements as part of a community’s subdivision and site plan regulations will allow greater flexibility for considering how the regulations can and should apply to each site.

LEGAL BASIS AND CONSIDERATIONS IN NEW HAMPSHIRE

The following discussion presents the legal basis for, and an overview of, how landscaping requirements can be integrated into the local land use planning process.

ZONING ORDINANCE

Pursuant to RSA 674:18, communities seeking to adopt local landscaping requirements as part of zoning ordinance must, as a prerequisite to adopting such zoning, have identified within the municipal master plan goals that support the proposed zoning. When identified as a goal in a municipal master plan landscaping standards can assist municipalities with accomplishing some of the basic purposes of zoning as provided in RSA 674:17, including promoting general health, safety, and welfare, providing adequate light and air, facilitating the adequate provision of water, and assuring proper use of natural resources.

Though landscaping is not explicitly included among the list of innovative land use controls provided in RSA 674:21,I, it is consistent with the methods contained in the statute, and is therefore permitted under this statute. Landscaping is an innovative planning technique because it promotes energy efficiency, reduces air and water pollution, supports wildlife habitat, conserves soil and helps prevent erosion, while maintaining and enhancing a community’s character.

SUBDIVISION AND SITE PLAN REGULATIONS

RSA 674:36 authorizes planning boards to adopt subdivision regulations, which may “require innovative land use controls on lands when supported by the master plan.”

In addition, the statute permits subdivision regulations to provide harmonious development of the municipality and its environs; including provisions that will create conditions favorable to health and safety; and, efficient development that promotes retention of wildlife habitat.

Similarly, RSA 674:44 grants planning boards the power to adopt site plan review regulations that may “require innovative land use controls on lands when supported by the master plan.” More specifically, the statute permits site plan regulations to guard against inadequate protection of groundwater and undesirable pollution, provide for safe and attractive development, and provide for development harmonious and aesthetically pleasing with the municipality and its environs.

EXAMPLES AND OUTCOMES

The following example highlights various approaches to promoting green spaces, minimizing air and water pollution, conserving energy, soil and water resources, and creating harmonious and visually appealing development, through landscaping.

BEDFORD, NEW HAMPSHIRE Route 3 Corridor Performance Zoning District

In 1993, the town of Bedford adopted a U.S. Route 3 Corridor Performance Zoning District. While conventional zoning tends to separate incompatible uses, the performance zoning approach was designed to provide greater flexibility in the planning process in order to promote a mix of compatible uses. A wide range of types of uses are permitted in the district, and compatibility is determined based on consideration of the appropriateness (i.e. type, intensity, scale) and quantifiable impact of a proposed use.

Included among the performance standards for the district are minimum and general landscape standards as well as landscape standards for signage. Intended to preserve and enhance the aesthetic qualities of the Route 3 corridor, the landscape standards are a matrix of planning options that provide design flexibility and creativity for the owner/developer, while ensuring a measure of uniformity and compatibility of landscape choices throughout the corridor. For example, while the landscape standards include a minimum side and rear planting requirement for visual screening, the standards identify a range of appropriate landscape options for that purpose, which can be used either individually or in combination.

According to Karen White, Bedford’s former planning director, “the community has been generally pleased with the results.” Professional landscape architects have enjoyed working with the ordinance, and it has been well received by builders and owners. White acknowledges two challenges they have had with the landscaping standards. First, the housing and retail boom in recent years has limited the availability of trees and shrubs that meet the minimum, at-planting, height requirements. Thus, the planning board has had to be flexible with reducing the minimum height requirements, in some cases. The second challenge has been keeping up the landscaping once it is installed. Some sites require enforcement by the town for removal and replanting of dead material. (See margin note in model language section below regarding temporary irrigation systems.)

Model Language and Guidance for Implementation

When considering the impacts of development on the environment, preservation of the existing landscape may be generally desirable, but is not always a practical or an available option. Most new, expanded or re-development construction projects require buildings, pavement, and, if required, at least some new landscaping. The model language below is designed to assist communities with striking a balance between preserving existing resources (i.e. vegetation, topography, and soil) and establishing requirements for selection, design, installation, and maintenance of new landscaping features. The model language addresses a combination of landscaping functions that provide a variety of environmental, economic, and social benefits to communities.

Due to the unique characteristics presented with each site, the applicability of landscaping standards should be considered on a site-specific basis. Including comprehensive landscaping requirements within a community's subdivision and site plan regulations, rather than the zoning ordinance, provides greater flexibility for considering the unique characteristics of each site.

A model zoning ordinance and model subdivision and site plan review regulations are presented below.

MODEL ORDINANCE FOR ZONING

ARTICLE __: LANDSCAPING

I. PURPOSE

The purpose of this article is to protect, enhance and promote the economic, ecological and aesthetic environment and protect and conserve the water resources of the Town/City of _____ through the use of certain landscape elements.

II. AUTHORITY

The provisions of this Article are adopted pursuant to RSA 674:16, Grant of Power and RSA 674:21, Innovative Land Use Controls.

III. APPLICABILITY

The requirements of this Article shall apply to _____ zoning district(s), and are consistent with the goals of the Town/City of _____ Master Plan (adopted on _____) including _____.

IV. DEFINITIONS

Arboriculture: The planting and care of woody plants (trees, shrubs, vines, and groundcovers).

Caliper: Diameter of a tree at 6 inches from the ground for trees 4 inches and under in caliper, and measured at 12 inches from the ground for trees measuring over 4 inches in caliper.

Damage: In reference to landscaping, includes any intentional, negligent, or accidental act that will cause vegetation to decline or die within a period of two years, including but not limited to, injury by heavy equipment; soil compaction by vehicular or pedestrian overuse; natural grade changes (cuts or fills); snow plow or snow load injury; fire injury or secondary infections through disease or pest infestation.

Dripline: An imaginary vertical plumb line that extends downward from the tips of the outermost tree branches and intersects the ground.

Drought Tolerant or Drought Resistant: A tree, shrub, or other plant that once established, will require limited or no regular irrigation for adequate appearance, growth and disease resistance.

Ground Cover: Low plants which generally form a continuous cover over time that are typically 3 feet or less in height.

Impervious Surface: Land surface with a low capacity for soil infiltration, including but not limited to pavement, roofs, roadways, human structures, paved parking lots, sidewalks, driveways (gravel and paved), and patios. Total impervious cover shall be calculated by determining the total of all impervious surfaces on a site as described above, regardless of whether the impervious surfaces are contiguous or non-contiguous.

Invasive (Plant) Species: Any plant species included on the most current list of prohibited invasive species prepared by the New Hampshire Invasive Species Committee.

Landscaped Area or Landscaping: That area within the boundaries of a given lot that is devoted to, and consists of, landscaping material, including but not limited to, trees, shrubs, perennials, vines, grasses, or other groundcovers, and annual flower beds. Hardscape materials may be included such as planters, brick, stone, placed rocks or boulders, water forms, and aggregates.

Landscape Plan: Graphic and written specifications for design, planting, and maintenance as well as detailed plans to create, arrange, and modify natural and man-made features.

Maintain, Maintenance: In reference to landscaping includes mulching, mowing, spraying, irrigating, fertilizing, propping, bracing, treating for disease or injury, snow removal, proper pruning techniques based on current arboriculture standards, and any other similar acts which promote the life, growth, health, safety, or beauty of the landscape vegetation.

Mulch: An organic material such as tree bark, wood chips, pine needles, leaf litter, grass clippings, or seed hulls used to control weed growth, reduce soil erosion and reduce water loss.

Native (Plant) Species – Plants that currently (or historically) grow as part of natural ecosystems that have co-evolved within the same planting zone.

New Development: Any construction or land disturbance of a parcel of land that removes or alters the vegetation or soil.

Parking Lot: Any off-street, unenclosed ground level facility used for the purpose of temporary storage of motor vehicles. Enclosed parking facilities, such as single or multi-story garages or parking facilities constructed within the confines of a larger building or structure, or parking facilities associated with single-family and duplex residential development are not included within this definition.

Parking Lot Island: A planting island contained completely within the confines of a parking lot.

Redevelopment: The reuse of a site or structure with existing man-made land alterations. A site is considered a redevelopment if it has 35 percent or more of existing impervious surface, calculated by dividing the total existing impervious surface by the size of the parcel and converting to a percentage.

Sediment: Solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

Shrub: A bushy, woody-stemmed plant, usually with several permanent stems usually less than 15-20 feet at maturity.

Site: The area, lot, or lots upon which development is to occur or has occurred.

Stormwater: Water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

Tree: Any self-supporting woody perennial plant which normally attains an overall height of at least ten 10 feet at maturity, either with one main stem or trunk or multiple stems or trunks as commonly grown in the nursery industry.

Vegetated Buffer: Land area used to visibly separate one use from another or to shield or block, noise, light or other nuisances. Vegetated buffers may include such things as fences or berms as well as all forms of plant growth, whether planted or naturally occurring.

Vegetation: Includes trees, plants, shrubs, vines, groundcovers, grasses, herbaceous perennials, or other forms of plant growth whether naturally occurring or planted.

V. SPECIAL PROVISIONS

- A. Site disturbance shall be minimized and existing vegetation and undisturbed soil shall be retained whenever possible. When site disturbance is necessary, top soil shall be stock-piled and stabilized for on-site redistribution within new landscaped areas. Stock-piled soil shall remain covered to prevent soil loss and sedimentation of nearby surface waters.
- B. Existing non-invasive vegetation shall be preserved wherever possible. Maximum effort should be made to preserve small stands of trees, rather than individual trees, to minimize the potential for serious damage due to wind, grade changes and soil compaction. No construction materials, equipment, vehicles, or temporary soil deposits shall be located within the dripline of

existing trees. Protective barriers shall be installed around each plant or group of plants that are to remain on site. Snow fence installed around the dripline of the tree canopy is an example of an acceptable barrier.

- C. Development shall follow the natural contours of the landscape to the maximum extent possible to minimize grading.
- D. Cut and fill shall be minimized, with the maximum height of any fill or depth of any cut area, as measured from the natural grade, not greater than 10 feet and preferably limited to four to six feet.
- E. Any contiguous area of disturbance, not associated with the installation of a roadway, shall be limited to 20,000 square feet for residential development and to 100,000 square feet for other types of development. Contiguous areas of disturbance shall be separated by at least 20 feet of area maintained at natural grade and retaining existing, mature vegetated cover.
- F. Lawn or grass covered areas may comprise no more than ____ percent or ____ square feet of the total vegetated area. A minimum of 2 different grass species with three or more preferred shall make up the seed or sod.
- G. Plants shall be selected based on consideration of site conditions and plant function. Use of native species is encouraged; hybrid varieties of native plants, and plants that are non-native and non-invasive are also permitted. Use of invasive species included on the N.H. Invasive Species Committee's most current list of prohibited invasive species, is not permitted in accordance with New Hampshire Agricultural Rule NH AGR 3800.

NH AGR 3800 states that "no person shall knowingly collect, transport, sell, distribute, propagate, or transplant any living or viable portion of any listed prohibited invasive species including all of their cultivars, varieties and specified hybrids."

As an alternative to exclusively requiring native species plantings, communities should consider requiring non-invasive species that provide ecological and wildlife values consistent with the site conditions and plant functions. For example, if the site design includes frontage along a state highway and retaining natural vegetation is not an option, drought and salt-tolerant plant species should be selected. The New Hampshire Invasive Species Committee maintains a list of invasive plants prohibited from sale, transport, distribution, propagation or transplantation in New Hampshire, which can be found on the NH Department of Agriculture, Markets and Food website www.agriculture.nh.gov. Information about the Invasive Species Committee is also available on that website. The UNH Cooperative Extension's "Alternatives to Invasive Landscape Plants" identifies plants with similar aesthetic and functional attributes for suggested use in place of invasive species, and is available at www.extension.unh.edu.

- H. Layered plantings of trees, shrubs, vines, perennials, groundcovers and leaf litter are encouraged to promote biological diversity in the landscape.
- I. Low maintenance landscapes are encouraged.
- J. The type and location of vegetation shall not interfere with utilities and the safe and efficient flow of street traffic or pedestrians.
- K. Nothing herein shall affect in any way the present or future acquired rights of any public utility or the Town/City of ____ to clear trees and/or other growth from lands used by the public utility or town/city. Using current arboriculture standards when pruning within public rights-of-way is strongly encouraged, as well as leaving a vegetated understory to prevent erosion.

- L. No ground disturbed as a result of site construction and development shall be left exposed to bare soil at the conclusion of construction. All areas, including landscape islands and strips, exposed by construction, with the exception of finished building, structure, and pavement footprints, shall be decompacted (aerated) and covered with a minimum thickness of 6 inches of non-compacted topsoil, and shall be subsequently planted with a combination of living vegetation such as grass, groundcovers, trees, and shrubs, and other landscaping materials. After planting, areas between plants where exposed soil remains shall be mulched at a depth no greater than 3 inches.

M. Tree Coverage

1. To promote the replacement of trees removed during site construction and development:
 - a. Developments serving single-family homes and duplexes must plant and maintain at least one tree for every 35 feet of frontage, with a minimum of one tree per lot. Trees shall have a minimum caliper of 2 inches when planted.
 - b. Developments serving uses other than single-family homes and duplexes must plant and maintain at least one tree for every 35 feet of frontage, with a minimum of one tree per lot, or at a density of one tree for every 400 square feet of paved area for non-street surfaces. Trees shall have a minimum caliper of 2-2½ inches when planted. To foster biological diversity when more than 10 trees are planted at the same time the “10-20-30 Rule” shall be used. (No more than 10% of the trees shall be of the same species, no more than 20% in the same genus, and no more than 30% in the same family.)
 - c. Trees shall be planted in locations that provide site value such as aesthetics, shading, and cooling of buildings or parking areas for energy efficiency, wildlife habitat, and stabilization of soils in disturbed areas. Trees shall not be planted in locations that block safe sight lines for vehicles and pedestrians entering and exiting the site.

FIGURE 3.6.4



Winterberry holly (Ilex verticillata), a native with red berries that persist into winter, attracts birds and is showy against snow.

FIGURE 3.6.5



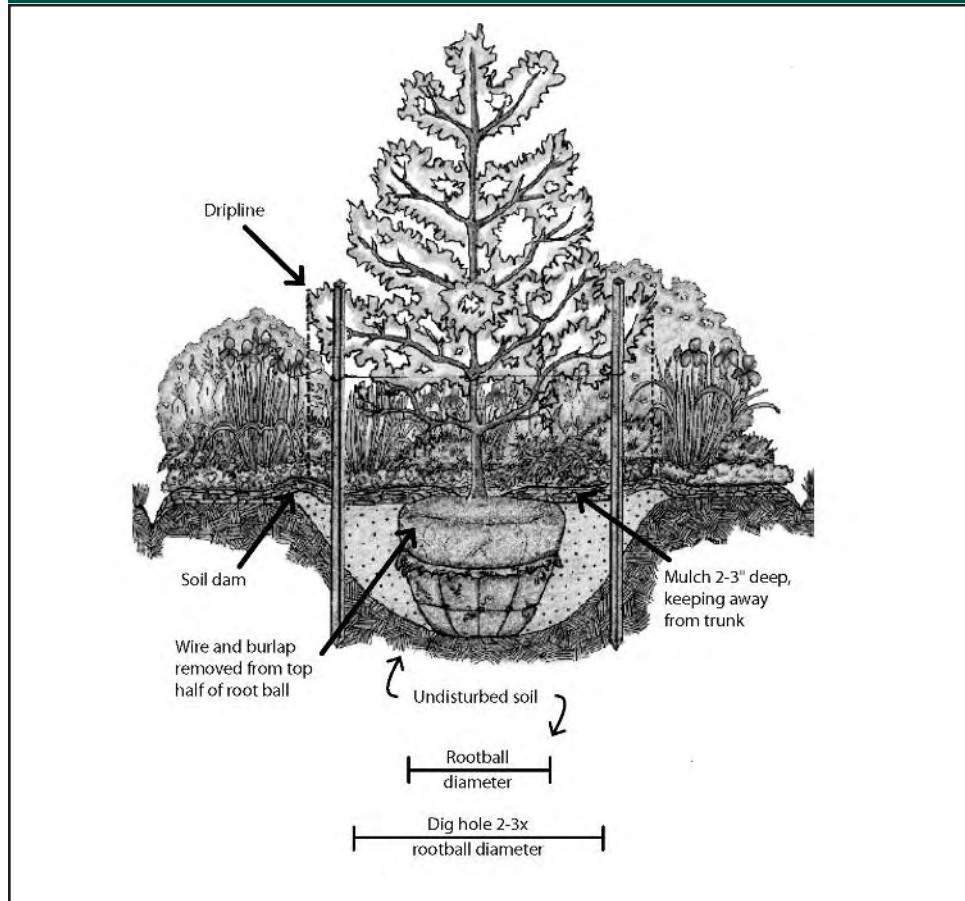
Landscapes that include many layers and varieties of plants begin to mimic natural ecosystems. These landscapes require less maintenance resulting in reduced energy use and lower energy costs.

Communities that adopt landscaping standards may also want to consider adopting screening standards in order to encourage screening of visually undesirable features from public view, protect the privacy of residents, and promote the community as one that cares about its appearance.

Planting trees and shrubs at proper depth is critical to their survival. Look for the trunk flare, the point where the trunk widens and roots begin to branch from the trunk. Remove any soil that covers the trunk flare. The trunk flare should be even with the surface of the ground. Take time to measure the rootball and dig the hole no deeper than this measurement. Illustration by Lauren Chase-Rowell, Outdoor Rooms Sustainable and Ecological Landscape Design Services.

N. All trees and shrubs shall be planted, maintained, or transplanted in accordance with accepted nursery and horticulture standards such as those specified by International Society of Arboriculture or the American Nursery and Landscape Association (See Figure 3.6.6).

FIGURE 3.6.6



VI. ENFORCEMENT

Any landscaping installed in accordance with the requirements of this Article or the Town/City ____ Subdivision or Site Plan Regulations shall be maintained in good order in perpetuity to achieve the objectives of this Article and applicable Subdivision and/or Site Plan Review Regulations. Failure to install, maintain or replace dead, diseased or damaged landscaping as required shall be considered a violation of this ordinance.

Communities will need to consider enforcement of landscaping standards. Communities with limited enforcement resources may choose to enforce these requirements on a complaint-driven basis, while communities with more advanced enforcement mechanisms may choose to regularly inspect all sites or all non-residential sites, for example. To ensure that applicants for building permits are familiar with local landscaping requirements, communities should consider amending building permit applications to include a note calling attention to such requirements and/or adding an item to a building permit checklist that identifies landscaping requirements.

MODEL SUBDIVISION REGULATIONS

SECTION _____: LANDSCAPING

A landscaping plan designed to preserve existing resources and features, promote wildlife habitat, conserve water resources, and support on-site stormwater control shall be submitted with all applications for subdivision. The landscaping plan shall be prepared by a licensed landscape architect, professional landscape designer, or nursery professional. The landscaping plan must address and comply with the requirements set forth herein:

I. PRESERVATION

Existing vegetation shall be preserved wherever possible. Existing natural features of special interest, such as large trees or those having historic relevance, shall be delineated and located on the landscaping plan. Proposed lot lines shown on a subdivision plan shall consider the location of identified features, and such features shall be preserved whenever possible. A note should be added to the site plan indicating that identified feature(s) shall be protected during site clearing and construction through the use of construction fencing or other adequate protective barriers. Maximum effort should be made to preserve small stands of trees rather than individual trees to minimize the potential for serious damage due to wind, grade changes and soil compaction. No construction materials, equipment, vehicles, or temporary soil deposits shall be located within the dripline of existing trees. Protective barriers shall be installed around each plant and/or groups of plants that are to remain on site. Snow fence installed around the drip line of the tree canopy is an example of an acceptable barrier.

II. BUFFERS

Subdivisions shall provide a vegetated buffer along the street or right-of-way providing frontage to the existing lot of record (see Figure 3.6.7).

- A. The buffer shall be a minimum of 20 feet in width and comprised of preserved natural non-invasive vegetation.
- B. As an alternative to II.A, the buffer may be designed in accordance with one or more of the following options. If existing vegetation in the buffer is predominantly comprised of lawn or grass, the buffer shall be designed in accordance with one or more of the following options:
 1. A minimum of one tree per 35 linear feet or portion thereof excluding curb cuts, densely planted with a combination of shrubs, perennials, vines, and groundcovers planted en masse to form a year-round dense screen at least 6 feet high within 3 years. A combination of both deciduous plants and evergreens are encouraged.
 2. A fence or wall of uniform appearance no more than 6-feet high (cannot be concrete block) may be used in conjunction with plant materials with a minimum 10 foot buffer between the fence and the street. A minimum of one tree per 35 linear feet, or portion thereof excluding curb cuts, with a

FIGURE 3.6.7



*Design vegetative buffers with a variety of layers that include both deciduous plants and evergreens. These buffers blend with natural landscapes and have more aesthetic appeal than the commonly planted row of *Arborvitae*.*

combination of shrubs, perennials, vines, and groundcovers planted en masse per 35 linear feet. A combination of both deciduous plants and evergreens are encouraged.

3. Spacing between individual trees shall not be more than 35 feet, not more than 6 feet for individual shrubs, and not more than 3 feet between individual perennials and groundcovers.

III. SIDEWALKS

Where sidewalks are required, a minimum four-foot buffer shall be provided between the street edge and a paved sidewalk or walkway area. It is strongly recommended that the buffer area be vegetated with perennials, groundcovers, and shrubs (30 inches or less at maturity). If grass is used, it shall be a mix of at least two different species with three or more preferred.

IV. CUL-DE-SACS

Where cul-de-sacs are permitted, the island or center area of the cul-de-sac shall remain in a natural vegetated state, with any invasive species removed. If it will be used as a biofilter for stormwater treatment, the area shall be vegetated with a combination of living plant material including trees, shrubs, and groundcovers.

Non-living landscape material may cover up to 20 percent of the island or center area. When planting of vegetation is required, cul-de-sac landscaping shall be installed after construction of the street is complete.

V. STREET TREES

When new streets are proposed as part of the subdivision, new streets shall be bordered with trees on both sides. To avoid damage to trees during construction, street trees shall be installed upon completion of the street construction, and street trees shall conform to the following standards:

- A. Trees shall be salt and drought-tolerant, native or non-invasive species, and have a structure and growth form which prevents them from obstructing sidewalks and walkways.
- B. Trees shall have a caliper of no less than 2-2½ inches when planted.
- C. Trees located under utility wires should be a low-growing species.
- D. To foster biological diversity trees planted along a given street shall use the “10-20-30 Rule” (No more than 10% of the trees shall be of the same species, no more than 20% in the same genus, and no more than 30% in the same family.)
- E. Trees shall be located no more than 35 feet apart.

- F. Trees should be located to avoid obstruction for driver visibility, and to avoid interference between root systems and utilities. Trees may be planted individually or clustered.
- G. All newly planted trees, shrubs and other vegetation shall have a watering plan during the establishment period (for trees, one-year-per-inch in caliper at planting, shrubs and other vegetation generally establish within one growing season). Mulching trees, shrubs, and plants helps retain soil moisture, moderates temperature fluctuations, provides protection from mechanical damage by mowers and trimmers, and serves as temporary covering of exposed soil until understory plants and ground covers fill in. However, thick applications of mulch (such as “volcano mulching”) will kill trees and other vegetation. Mulch shall be no greater than 3 inches in depth and shall not be in contact with the bark or stems of plants.
- H. Incentive Bonuses:
 - 1. Two existing healthy and non-invasive trees, with a caliper of 3 inches or greater, preserved using proper protection methods within the required planting area, may be substituted for one required tree, to be determined by the planning board.
 - 2. Where an applicant proposes leaving a significant portion of healthy trees within the construction area, alternative landscaping designs will be considered.

VII. VEGETATION

Vegetation planted in accordance with the requirements of this section shall be native or non-invasive species selected for their adaptability to the climatic, geologic and topographical conditions of the site.

- A. Shrubs and hedges shall be a minimum of 24 inches in height when measured immediately after planting. Groundcovers and perennials may be less.

VIII. DOCUMENTATION

A note should be added to the plan indicating that “Development of lots shown on an approved subdivision plan shall comply with the landscaping requirements set forth in the Town/City of ____ Zoning Ordinance and Subdivision Regulations.”

IX. PERFORMANCE GUARANTEE

- A. To ensure that landscaping is installed in accordance with the final approved landscaping plan, a performance guarantee shall be provided as a condition of approval in an amount determined by the planning board. The performance guarantee shall be released following an inspection by the Town of [Name] Code Enforcement Officer.
- B. To ensure that landscaping functions as designed and all plants remain healthy, a performance guarantee shall be required, as a condition of approval, which will be held a minimum of 24 months after an approved inspection as required in Section __.IX.1.

X. MAINTENANCE

- A. If the street is to be a private street, cul-de-sac landscaping, street trees and other landscaping as required shall be maintained by a property owners association that is responsible, in perpetuity, for maintaining all landscaping in good condition and replacing as necessary to the standards herein, and to keep landscaped areas free of refuse and debris. The legal instrument establishing this requirement as part of the homeowners association shall be submitted to the planning board for review and comment by town counsel prior to the planning board taking final action on the application.
- B. If the street is to be dedicated to and accepted by the Town/City of ____, the town/city shall be responsible for maintaining street trees and cul-de-sac landscaping.

MODEL SITE PLAN REVIEW REGULATIONS

SECTION ____: LANDSCAPING

A landscaping plan designed to preserve existing resources and features, promote wildlife habitat, and support on-site stormwater control shall be submitted with an application for site plan review. Due to the variation of each site, creativity and diversity in landscaping is encouraged. The landscaping plan shall be prepared by a licensed landscape architect, professional landscape designer, or nursery professional.

The landscaping plan must address and comply with the requirements set forth herein:

I. GENERAL REQUIREMENTS

- A. Existing vegetation shall be preserved wherever possible. Existing natural features of special interest, such as those having historic relevance, shall be delineated and located on the landscaping plan. A note should be added to the site plan indicating that identified feature(s) shall be protected during site clearing and construction through the use of construction fencing or other adequate protective barriers. Maximum effort should be made to preserve small stands of trees, rather than individual trees, to minimize the potential for serious damage due to wind, grade changes and soil compaction. No construction materials, equipment, vehicles, or temporary soil deposits shall be located within the dripline of existing trees. Before commencement of work, protective barriers shall be installed and maintained around each plant and/or groups of plants that are to remain on site until completion. Snow fence installed around the dripline of the tree canopy is an example of an acceptable barrier.
- B. Vegetation planted in accordance with the requirements of this section shall be non-invasive species selected for their adaptability to the climatic, geologic and topographical conditions of the site.
- C. Shrubs and hedges shall be a minimum of 24 inches in height when measured immediately after planting. Groundcovers and perennials may be less.
- D. Effective use and preservation of natural berms, existing topography and existing vegetation is encouraged.
- E. Landscaped beds shall be used to separate parking areas from the portion of a building providing access to the building.
- F. Vegetated Buffer: Plants or a combination of plants and other landscaping material shall be used to form a buffer between non-residential and residential uses. The buffer shall be at least 20 feet

FIGURE 3.6.8



Adding landscape plantings to separate uses provides a visual transition, and can increase property value.

wide, densely planted (or equivalent natural growth), and form a year-round dense screen at least 6 feet high within 3 years. A minimum of one tree per 35 feet or portion thereof, with a combinations of shrubs, perennials, vines, and groundcovers shall be planted enmasse among the trees. Spacing between individual trees shall not be more than 35 feet, not more than 6 feet apart for individual shrubs, and not more than 3 feet between individual perennials and groundcovers. A combination of evergreens and deciduous plants are encouraged. As an alternative, a fence or wall of uniform appearance not more than 6-feet high (concrete block cannot be used) and extending to within six inches of ground level may be used in conjunction with the above plant materials with a minimum 15 foot vegetative buffer.

- G. Plants, or a combination of plants and a solid visual barrier such as wooden fencing, or berms, shall be used to screen loading, waste disposal, material storage and other areas that are likely to generate noise, dust, or other potentially disruptive conditions.
- H. Landscaping shall be used to establish and/or maintain an attractive streetscape adjacent to roadways. A minimum of one tree per 35 linear feet or portion thereof.
- I. To promote on-site water retention and filtration, landscaped areas shall be designed in a manner that guides stormwater from on-site impervious streets, parking areas, sidewalks and walkways to vegetated areas or approved retention areas.

See the stormwater management chapter for more detailed requirements addressing **water quality**.

FIGURE 3.6.9



Openings in curbed-areas allow vegetation to filter, slow, and retain stormwater.

- J. Curbing or equivalent barriers shall be required to protect vegetation from vehicular damage. Barriers shall be designed with openings that allow stormwater to flow into vegetated areas.
- K. The type and location of vegetation shall not interfere with utilities or the safe and efficient flow of street traffic.
- L. No trees or shrubs shall obstruct the view between the street and the access drives and parking aisles near entries and exits. Plantings within 25 feet of an intersection shall not exceed a maximum mature height of 30 inches.
- M. When irrigation systems are proposed, a temporary watering plan/ schedule, or low volume (drip) irrigation system shall be required. Permanent irrigation

systems are prohibited, except as noted below. Temporary irrigation systems shall be designed and installed for efficient and effective water use to the landscaped area for a limited period of time determined by the plant material and site conditions. (See margin note.) For those exceptions when permanent irrigation is considered necessary, such as an athletic field, permanent irrigation shall utilize water saving technologies, including rain sensors, flow meters, and management systems that monitor current weather conditions.

N. A maintenance plan shall be provided with the site plan application. All landscaped areas shall receive regular maintenance and upkeep. Severely injured, diseased, or dead plant material shall be replaced in kind in perpetuity (avoid replacing landscape materials in the period from November to March.) Best practices to minimize environmental impacts such as the use of low phosphorous fertilizer and slow release nitrogen, shall be included in the management plan. If ownership of a site is conveyed to a new property owner the new owner shall be responsible for maintaining all landscaping in accordance with the approved final landscaping plan.

When developing local landscaping regulations, communities should consider adding criteria that specify circumstances to include a temporary low volume watering system (i.e. drip irrigation) as part of a landscaping plan until plants become established. Providing adequate water during the establishment period is critical to the long-term success of the landscape. The establishment period for trees is one-year-per-inch in caliper at planting. Shrubs and other vegetation will generally establish within one growing season. Permanent irrigation systems are generally not essential and may create inefficient water use if not properly maintained.

II. PARKING LOTS

- A. Interior landscaped beds shall be required for all parking lots with multiple adjacent parallel parking rows. Required interior landscaping shall be a minimum of 10 percent of the total area of driveways and parking. The maximum number of continuous parking spaces permitted shall be twenty. Interior landscaping shall be in addition to any required perimeter landscaping as specified below, and shall include trees, along with shrubs, perennials, and/or groundcovers planted enmasse among the trees. Plant materials shall be suitable for site conditions including location, soil conditions, and exposure to environmental factors.
- B. Bare soil is not acceptable. The introduction of groundcovers and/or perennials planted enmasse and the use of mulch as a soil covering is acceptable. However, no more than 20 percent of the minimum landscaped area may be covered with non-living landscaping material such as bark mulch, woodchips, or leaf litter.
- C. In order to break up the visual expansiveness of parking lots, interior landscaped beds shall be installed in the form of landscape strips and/or landscape islands. Depressed vegetated landscaped beds are encouraged to infiltrate stormwater.
- D. Landscape strips shall be a minimum of 15 feet in width.
- E. Landscape islands shall be a minimum of 20 feet in width.

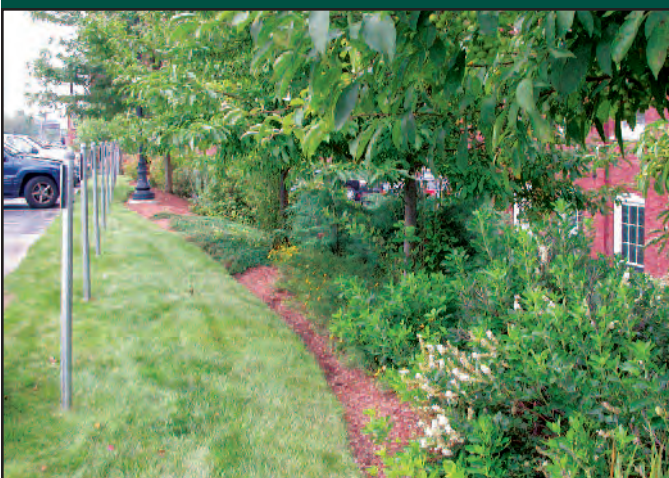
FIGURE 3.6.10



Shrubs, perennials, and groundcovers planted among trees in landscape strips or islands minimize soil compaction from pedestrian foot traffic, and can capture and filter stormwater.

- F. Parking lots with more than 50 parking spaces shall have landscape islands serving as end-caps to each row.
- G. The interior of parking lots shall have no less than one tree for every 10 parking spaces. The trees may be clustered together in landscape islands with shrubs, perennials, and ground covers planted enmasse among the trees. This requirement is in addition to any trees required in Article __.VJ.b of the Town of ____ Zoning Ordinance.
- H. Snow storage shall not be permitted on any landscape area.
- I. **Incentive Bonuses:**
 - 1. Each existing healthy and native or non-invasive tree, with a caliper of three inches or greater, preserved using proper protection methods within the interior parking lot area may be substituted for one tree required for every 10 parking spaces.
 - 2. Where an applicant proposes leaving a significant portion of healthy non-invasive trees and other vegetation within the proposed construction area, the planning board will consider alternative landscaping designs.
- J. **Perimeter Landscaping for Parking Areas:** Along the perimeter of parking lots with ten or more spaces a buffer of perimeter landscaping is required along at least 75% of the length of right-of-way. The buffer width shall be a minimum of 20 feet, though the planning board may require a wider buffer when the use, building or site conditions dictate that a larger buffer would better serve the intent of these regulations. The vegetated buffer shall include existing non-invasive plant material, where appropriate, in combination with new trees, shrubs, perennials and groundcovers of suitable type, characteristics to meet site-specific requirements in order to provide longevity of the landscape. The buffer shall include one or more of the following options:

FIGURE 3.6.11



This vegetative buffer serves several purposes: It shades cars in the parking lot, provides nice views for office workers, creates habitat for wildlife, reduces the amount of lawn maintenance required, and decreases stormwater runoff coming from the roof.

- 1. A minimum of one tree per 35 linear feet or portion thereof excluding curb cuts, with a combination of shrubs, perennials, vines, and groundcovers planted en masse. The trees may be clustered together with shrubs, perennials, and groundcovers planted enmasse among the trees. A combination of both deciduous plants and evergreens are encouraged.
- 2. A wall, or fence of uniform appearance 6 feet high of brick, stone or finished concrete (cannot be concrete block) may be used in conjunction with plant materials with a minimum 10 foot-buffer between the fence and the street. A minimum of one tree per 35 linear feet or portion thereof with a combination of shrubs, perennials, vines, and groundcovers planted en masse per 35 linear feet excluding curb cuts. A combination of both deciduous plants and evergreens are encouraged.
- 3. Spacing between individual trees shall not be

more than 35 feet, not more than 6 feet apart for individual shrubs, and not more than 3 feet between individual perennials and groundcovers.

4. If the area abutting the street is existing woodland, a 25-foot woodland buffer may be left in lieu of landscaping if approved by the planning board.

III. TREES

- A. Trees shall be salt and drought-tolerant, native or non-invasive species, and have a structure and growth form which prevents them from obstructing side-walks and walkways.
- B. Trees shall have a caliper of no less than 2-21/2 inches when planted.
- C. Trees located under utility wires should be a low-growing species.
- D. To foster biological diversity trees planted along a given street shall use the “10-20-30 Rule” (No more than 10% of the trees shall be of the same species, no more than 20% in the same genus, and no more than 30% in the same family.)
- E. Trees shall be located no more than 35 feet apart.
- F. Trees should be located to avoid obstruction for driver visibility, and to avoid interference between root systems and utilities. Trees may be planted individually or clustered.
- G. All newly planted trees, shrubs and other vegetation shall have a watering plan during the establishment period (for trees, one-year-per-inch in caliper at planting, shrubs and other vegetation generally establish within one growing season). Mulching trees, shrubs, and plants helps retain soil moisture, moderates temperature fluctuations, provides protection from mechanical damage by mowers and trimmers, and serves as temporary covering of exposed soil until understory plants and ground covers fill in. However, thick applications of mulch (such as “volcano mulching”) will kill trees and other vegetation. Mulch shall be no greater than 3 inches in depth and shall not be in contact with the bark or stems of plants.
- H. **Incentive Bonuses:**
 1. Each existing healthy and non-invasive tree, with a caliper of 3 inches or greater, preserved using proper protection methods within the required planting area may be substituted for one required tree.
 2. Where an applicant proposes leaving a significant portion of healthy trees within the construction area, alternative landscaping designs will be considered.

The planning board may want to consider establishing provisions for existing parking lots, for example requiring existing lots to comply with this Section (re: parking) only if new spaces are added.

IV. PLAN REQUIREMENTS

- A. Landscaping plans shall include dimensions and distances and clearly delineate the existing and proposed parking spaces, or other vehicular uses, access, aisles, driveways, and the location, and description of all landscape materials, including the quantity and common and botanical names of all plants.

- B. Landscape plans shall be provided at the same scale as the engineering drawings unless otherwise required by the planning board for review purposes.
- C. Snow storage areas shall be clearly shown on the plan and are not permitted on any landscaped areas. In accordance with NH DES Best Management Practices snow storage areas and snow dumps shall be located so that snow melt runoff is directed to vegetated swales or filter strips created for that purpose.
- D. A planting plan shall provide specifications regarding the plant placement, type, size and spacing, and other features as required by this section. Trees and shrubs shall be specified according to the American Standard for Nursery Stock by the American Nursery and Landscape Association.
- E. Depending on the nature and scale of the proposed use, a temporary watering plan, or low volume (drip) irrigation system shall be required. When required, irrigation systems shall be designed and installed for efficient and effective use of water to the landscaped area. Permanent irrigation systems are generally prohibited.
- F. A maintenance plan shall be provided with the site plan application. All landscaped areas shall receive regular maintenance and upkeep. Severely injured, diseased, or dead plant material shall be replaced in kind in perpetuity (avoid replacing landscape materials in the period from November to March.) Best practices to minimize environmental impacts such as the use of low phosphorous fertilizer and slow release nitrogen, shall be included in the management plan.
- G. The Planning Board may seek an advisory opinion regarding the submitted landscape plan at the expense of the applicant.
- H. The Planning Board will seek an advisory opinion of the conservation commission or other municipal board or committee regarding the landscape plan, if deemed necessary.

V. SECURITY/PERFORMANCE BOND

- A. To ensure that landscaping is installed in accordance with the final approved landscaping plan, a performance guarantee shall be provided as a condition of approval in an amount determined by the planning board. The performance guarantee shall be released following and inspection by the Town of ____ Code Enforcement Officer.
- B. To ensure that landscaping functions as designed and all plants remain healthy, a performance guarantee shall be required, as a condition of approval, which will be held a minimum of 24 months after an approved inspection as required in Section __.IX.1.

VI. MAINTENANCE

- A. The property owner, or owners association if applicable, is responsible, in perpetuity, for maintaining all landscaping in good condition. Landscaping shall be kept free of refuse and debris, and shall be replaced as necessary to the standards herein.

- B. If the ownership of a site is conveyed to a new property owner, the new owner shall be responsible for maintaining all landscaping in accordance with the approved final landscaping plan.
- C. Proposed modifications of an approved landscaping plan shall be submitted to the planning board for review and approval. The planning board shall notify the owner of acceptance of the modified plan or request additional information within 60 days of receipt of proposed modifications. The currently approved plan shall remain in effect until notification of approval has been issued, or the 60 day period has lapsed.

Communities may want to consider requiring that a legal maintenance agreement be established to address all aspects of maintenance including vegetation replacement; pruning, fertilizing and insect and disease protection; litter or debris clean-up; and, drainage and tree protection if the proposed landscaping will create a change in the existing grade.

VII. ENFORCEMENT

- A. An inspection of all plantings to ensure compliance with the submitted landscape plan shall be conducted prior to the issuance of a certificate of occupancy.
- B. Ongoing inspections of landscapes shall be conducted to ensure compliance of landscape maintenance in perpetuity.

REFERENCES

Landscape Standards and Guidelines

American Standard for Nursery Stock, (2004 or more recent edition) www.anla.org/publications/index.cfm?

Best Management Practices Series, International Society of Arboriculture secure.isa-arbor.com/store/BMPs-C59.aspx

Lawn and Water Conservation

Guide to Lawn and Landscape Water Conservation (2002) and *Lawn and Landscape Water Conservation – An Addendum to the Water Conservation Standards for the Commonwealth of Massachusetts, added to the Conservation Standards by the Water Resources Commission as of October 10, 2002*, were referenced in the preparation of this chapter. The guide is available at www.mass.gov/envir/mwrc/pdf/LawnGuide.pdf, and the Addendum is available at www.mass.gov/dcr/waterSupply/intbasin/docs/lawnstandard.doc.

University of New Hampshire Cooperative Extension has an extensive list of landscaping topics including the following publications:

Integrated Landscaping Following Nature's Lead (2008)

Landscaping at the Water's Edge (2007)

Best Plants for New Hampshire Gardens and Landscapes (2003)

Information Fact Sheets

Alternatives to Invasive Landscape Plants

<http://extension.unh.edu/Pubs/HGPubs/altinvs2.pdf>

Drought Tolerant Plants for NH Landscapes

<http://extension.unh.edu/Pubs/HGPubs/drtolhom.pdf>

Efficient Water Use in Landscapes & Nurseries,

<http://extension.unh.edu/Pubs/HGPubs/effwtrcom.pdf>

Fertilizing Trees and Shrubs

<http://extension.unh.edu/Pubs/HGPubs/ferttshr.pdf>

Landscaping with Flowers

<http://extension.unh.edu/Pubs/HGPubs/landflwr.pdf>

Landscaping Woodland Areas

<http://extension.unh.edu/Pubs/HGPubs/landwood.pdf>

Planting and Mulching Trees and Shrubs

<http://extension.unh.edu/Pubs/HGPubs/CNMULCH.pdf>

Pruning Deciduous Shrubs in the Landscape

<http://extension.unh.edu/Pubs/HGPubs/PrunDec.pdf>

Pruning Evergreens in the Landscape

<http://extension.unh.edu/Pubs/HGPubs/PrunEverg.pdf>

Pruning Shade Trees in the Landscape

<http://extension.unh.edu/Pubs/HGPubs/prunshad.pdf>

Relative Tolerance of Selected Tree Species to Air Pollution Injury

<http://extension.unh.edu/Pubs/HGPubs/treetol.pdf>

Sour Mulch

http://extension.unh.edu/news/2007/06/watch_out_for_sour_mulch.html

Steps to Follow When Planting Trees and Shrubs

<http://extension.unh.edu/Pubs/HGPubs/stepspts.pdf>

Using Plants in the Landscape

<http://extension.unh.edu/Pubs/HGPubs/uplandsc.pdf>

More publications and information on soil testing and plant diagnostic services can be found on the website at <http://extension.unh.edu>.

Invasive Plants

Alternatives to Invasive Landscape Plants (2005) by Catherine Neal, UNH Extension Specialist, University of New Hampshire Cooperative Extension, Provides a list of plants with similar ecological and aesthetic function and value as identified invasive plant species <http://extension.unh.edu/Agric/AGNLT/NLTLand.htm>

Guide to Invasive Upland Plant Species in New Hampshire (2005) prepared by the N.H. Department of Agriculture, Markets and Food (DAMF), Plant Industry Division and New Hampshire Invasive Species Committee includes a list and descriptions of invasive upland species that may be found in New Hampshire.

<http://extension.unh.edu/forestry/Docs/invasive.pdf> or contact the DAMF.

Trees

Planting Trees in Designed and Built Community Landscapes: Checklists for Success (1998) by Mary K. Reynolds and H. Sharon Ossenbruggen (2nd Ed.). For more information on these resources contact the Division of Forests and Lands or visit the Division's website, www.nhdf.org.

Recommended Urban Trees: Site Assessment and Tree Selection for Stress Tolerance (2003)
 Urban Horticulture Institute, Department of Horticulture, Cornell University
 Ithaca, New York
<http://www.hort.cornell.edu/uhi/outreach/recurbtree/pdfs/01cover.pdf>

Urban Ecosystem Research and Analysis for Cities and Towns

American Forests, an organization whose mission is to grow a healthier world, has conducted numerous studies, called Urban Ecosystem Analysis, to assess the advantages of tree canopies in communities. The analysis uses a GIS-based process to assess the community's stormwater runoff, air quality, summer energy savings, carbon storage and avoidance, and tree growth. To read an analysis report or view success stories, refer to the American Forests website at www.americanforests.org.

State and Municipal Regulations

Town of Bedford, N.H.

The Town of Bedford's Zoning Ordinance and Subdivision and Site Plan Regulations include landscaping requirements referenced in the preparation of this chapter. Contact the town for a copy of the most current regulations.

Town of Durham, N.H.

The Town of Durham's Zoning Ordinance and Subdivision and Site Plan Regulations include landscaping requirements referenced in the preparation of this chapter. Contact the town for a copy of the most current regulations.

City of Keene, N.H.

The City of Keene's Landscaping Requirements from Zoning and Regulations were referenced in the development of this chapter. Contact the city's Planning Department for a copy of the city's current land use code.

City of Nashua, N.H.

The City of Nashua Land Use Code landscaping requirements were referenced in the development of this chapter. The city's Land Use Code is available on the city's website, www.ci.nashua.nh.us.

Town of Northwood, N.H.

The Town of Northwood's Site Plan Review Regulations section on landscaping was referenced in the development of this chapter. Contact the Town Planner for a copy of the Site Plan Review Regulations.

City of Oklahoma City, Okla.

Oklahoma City's Landscaping Requirements (Ordinance No. 22,366, Effective January 30, 2004), were referenced in the preparation of this chapter. The ordinance is available on the city's website at www.okc.gov.

Town of Peterborough, N.H.

The Town of Peterborough's Zoning Ordinance and Subdivision and Site Plan Regulations include landscaping requirements referenced in the preparation of this chapter. Contact the town for a copy of the most current regulations.

